

# Power Inductor

## Automotive Grade

### AMNI Series



#### Overview

Power inductors are passive electronic components used in various circuits to store energy in a magnetic field when electrical current flows through them. They are critical in filtering, energy storage, and noise suppression in power electronic systems. They are designed to handle higher currents and are optimized for minimal power loss and thermal efficiency. This series has a lower DCR than the AMMx series

#### Benefits

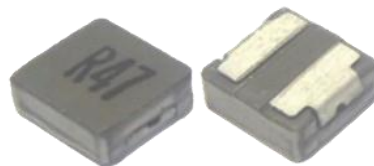
1. Automotive grade available
2. Low DCR and ACR
3. High current and efficiency

#### Applications

1. Automotive Systems for ADAS, infotainment.
2. Industrial Equipment: Robotics, power tools, industrial automation, and IoT devices.
3. DC-DC converters, inverters, and battery management systems.
4. Base stations, 5G infrastructure, and signal processing systems.
5. Telematics

#### Product Information

| Series | L (mm) | W(mm) | T (mm) | Inductance (μH) |
|--------|--------|-------|--------|-----------------|
| AMNI   | 4      | 4     | 2.1    | 0.16 ~ 22       |
|        | 4.0    | 4     | 3.1    |                 |
|        | 5.6    | 5.5   | 3.1    |                 |
|        | 6.36   | 6.56  | 3.1    |                 |
|        | 6.36   | 6.56  | 6.1    |                 |
|        | 7.2    | 7.5   | 2      |                 |
|        | 7.2    | 7.5   | 3.1    |                 |
|        | 7.2    | 7.5   | 7      |                 |

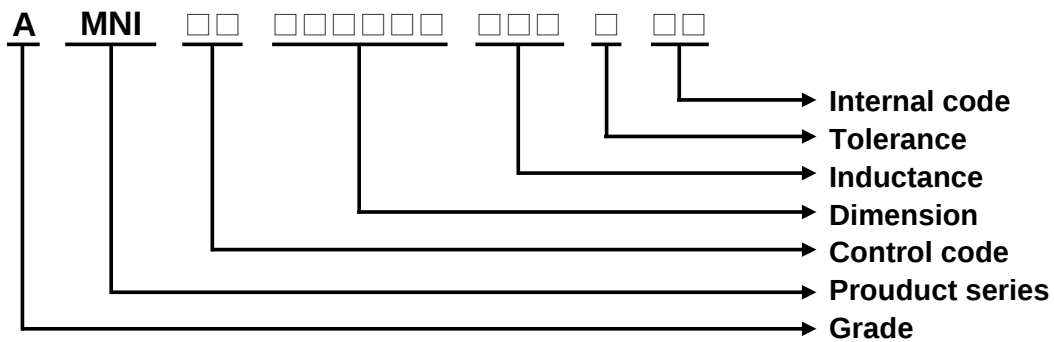


## AMNI00070770 Series Specification

AEC-Q200

**1 Scope** This specification applies to large current and low loss SMD power inductor

### 2 Part numbering

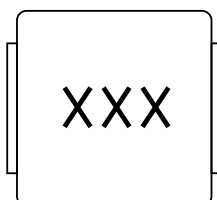


### 3 Temperature rating

Operating Temperature: -55°C~125°C

Storage Temperature: (on tape & reel): -20°C to +40°C; 75% RH max.

### 4 Marking



Marking : 3R3

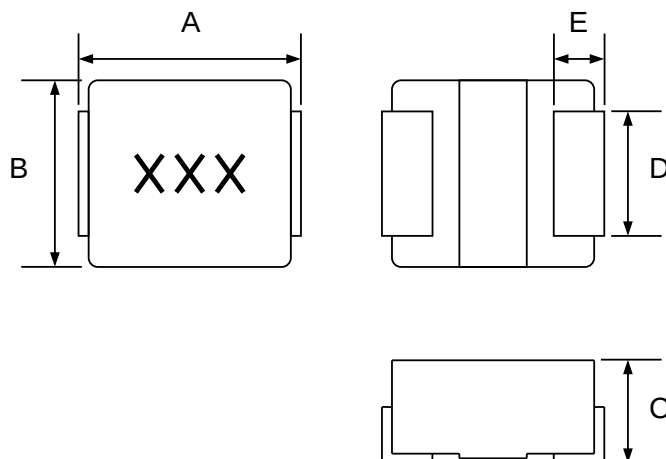
### 5 Standard testing condition

|             | Unless otherwise specified       | In case of doubt |
|-------------|----------------------------------|------------------|
| Temperature | Ordinary Temperature(15 to 35°C) | 20 to 30°C       |
| Humidity    | Ordinary Humidity(25 to 85% RH)  | 50 to 80 %RH     |

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### 6 Configuration and dimensions



Dimensions in mm

| Type | 070770    |
|------|-----------|
| A    | 7.2 ± 0.5 |
| B    | 7.5 ± 0.5 |
| C    | 7.0 Max   |
| D    | 5.0 ± 0.3 |
| E    | 1.5 ± 0.3 |

| Size Code | Net weight(grms) |
|-----------|------------------|
| 070770    | 2.22 (typ.)      |

### 7 Electrical characteristics

| Part number        | Inductance (uH) | Tolerance (±%) | Test Freq.  | I <sub>rms</sub> (A) Typ. | I <sub>sat</sub> (A) Typ. | RDC (mΩ) Max.(Typ.) | Marking |
|--------------------|-----------------|----------------|-------------|---------------------------|---------------------------|---------------------|---------|
| AMNI000707703R3MXB | 3.3             | 20             | 100kHz,0.5V | 15.1                      | 19.4                      | 9.42(8.56)          | 3R3     |
| AMNI000707704R7MXB | 4.7             | 20             | 100kHz,0.5V | 13.6                      | 15.2                      | 14.26(12.96)        | 4R7     |
| AMNI000707705R6MXB | 5.6             | 20             | 100kHz,0.5V | 11.4                      | 13                        | 15.03(13.67)        | 5R6     |

#### Note:

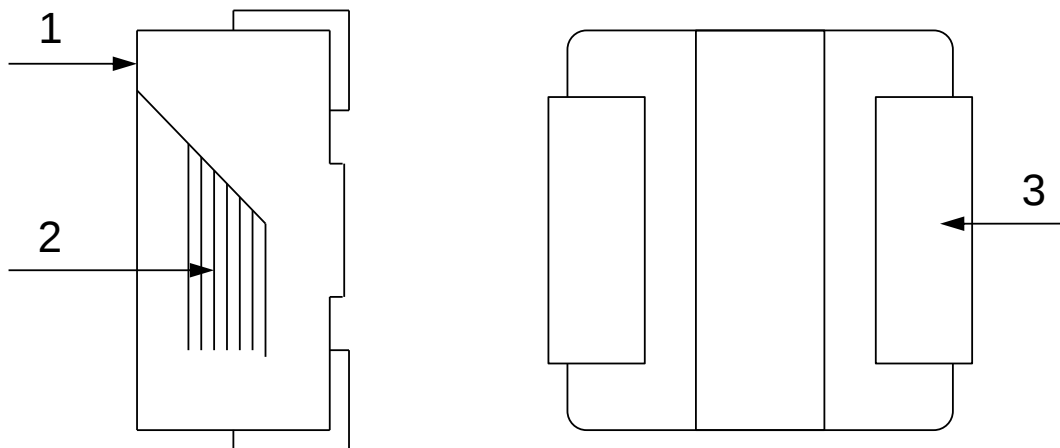
- Operating temperature range -55°C to 125°C.
- I<sub>sat</sub> for Inductance drop 30% from its value without current.
- I<sub>rms</sub> for a 40°C temperature rise from 25°C ambient.
- The part temperature (ambient + temp rise) should not exceed 125°C under worst case operating conditions. Circuit design 125°C under worst case operating conditions. Component placement, PCB trace size and thickness, airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application.
- Absolute maximum voltage 25V DC. (Based on test method, it may not the same under different application, it is recommended to verify first.)

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### 8 AMNI00070770 Series

#### 8.1 Construction



#### 8.2 Material List

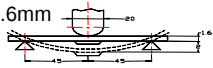
| Item | Part          | Description           |
|------|---------------|-----------------------|
| 1    | Magnetic core | Magnetic metal powder |
| 2    | Coil          | Enameled copper wire  |
| 3    | Terminals     | Copper based terminal |

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## 9 Reliability test items

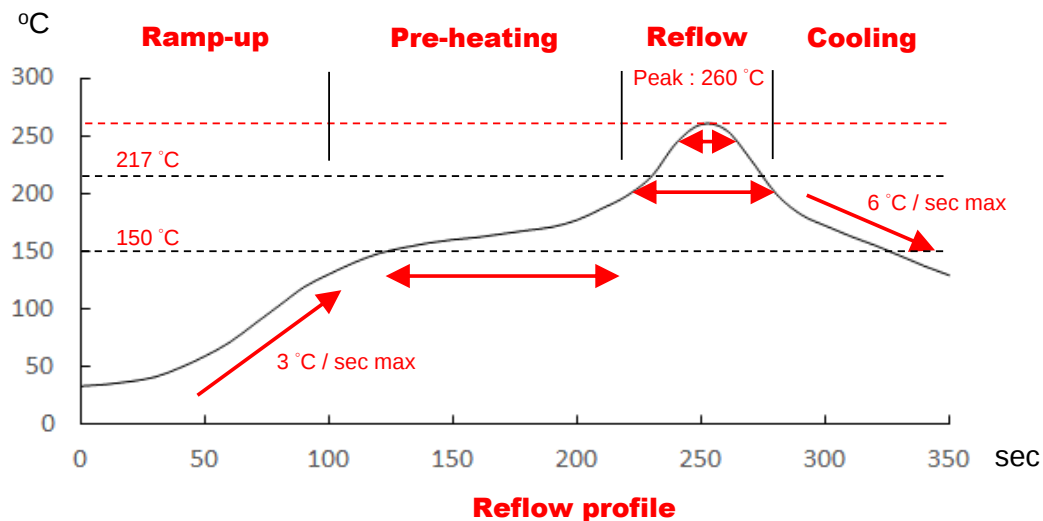
### 1-1.Mechanical Performance

| No    | Item                         | Specification                                                                                     | Test Method                                                                                                                                                                                                                                                                           |
|-------|------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-1-1 | Board Flex                   | The forces applied on the right conditions must not damage the terminal electrode and the ferrite | Refer to AEC-Q200-005<br>Test device shall be soldered on the substrate<br>Substrate Dimension: 100x40x1.6mm<br>Deflection: 2.0mm<br>Keeping Time: 60sec<br>                                       |
| 1-1-2 | Resistance to Soldering Heat | Appearance: No damage<br>Inductance change shall be within $\pm 10\%$ .                           | Refer to MIL-STD-202 Method 210<br>Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free)<br>Solder Temperature: $260 \pm 5^\circ\text{C}$<br>Immersion Time: $10 \pm 1\text{sec}$                                                                                                               |
| 1-1-3 | Solder ability               | The electrodes shall be at least 95% covered with new solder coating                              | Refer to J-STD-002<br>Pre-heating: $150^\circ\text{C}$ , 1min<br>Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free)<br>Solder Temperature: $245 \pm 5^\circ\text{C}$ (Pb-Free)<br>Immersion Time: $4 \pm 1\text{sec}$                                                                        |
| 1-1-4 | Terminal Strength Test       | Appearance: No damage                                                                             | Refer AEC-Q200-006<br>Soldered on PCB for testing as fig.<br>Force : 1.8kg<br>Keeping Time: 60 seconds.                                                                                                                                                                               |
| 1-1-5 | Resistance to Solvent        | There must be no change in appearance or obliteration of marking                                  | Refer to MIL-STD-202 Method 215<br>Inductors must withstand 6 minutes of alcohol or water.<br>Sample Size : 15 pcs                                                                                                                                                                    |
| 1-1-6 | Vibration                    | Appearance: No damage<br>Inductance change shall be within $\pm 10\%$ .                           | Refer MIL-STD-202 Method 204<br>Vibration waveform: Sine waveform<br>Vibration frequency: 10Hz~2000Hz<br>Vibration acceleration: 5g<br>Sweep rate: 0.764386octave/minute<br>Duration of test: 12 cycles each of 3 orientations, 20 minutes for each cycle<br>Vibration axes: X, Y & Z |

### 1-2.Environmental Performance

| No    | Item                                | Specification                                                         | Test Method                                                                                                                                                                                                                                                                                               |
|-------|-------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-2-1 | Temperature Cycle                   | Appearance: No damage<br>Inductance change shall be within $\pm 20\%$ | Refer to JESD Method JA-104<br>Total cycles: 1000 cycles<br>Temperature Cycling Test Conditions : $-55$ to $125^\circ\text{C}$<br>$-55^\circ\text{C}$ Soak Mode Condition : 30 minutes<br>$125^\circ\text{C}$ Soak Mode Condition : 30 minutes<br>Measured after exposure in the room condition for 24hrs |
| 1-2-2 | Biased Humidity Resistance          |                                                                       | Refer to MIL-STD-202 Method 103<br>Temperature: $85 \pm 2^\circ\text{C}$<br>Relative Humidity:85% / Time: 1000hrs<br>Measured after exposure in the room condition for 24hrs                                                                                                                              |
| 1-2-3 | High Temperature Exposure (Storage) |                                                                       | Refer to MIL-STD-202 Method 108<br>Temperature: $125 \pm 3^\circ\text{C}$ / Relative Humidity: 0%<br>Applied Current: Rated Current /Time: 1000hrs<br>Measured after exposure in the room condition for 24hrs                                                                                             |
| 1-2-4 | Operational Life                    |                                                                       | Refer to MIL-PRF-27<br>Temperature: $85 \pm 3^\circ\text{C}$<br>Applied Current : Rated Current<br>Time: 1000hrs<br>Measured after exposure in the room condition for 24hrs                                                                                                                               |

**10 Recommended IR reflow profile**



Lead-Free(LF)

Refer to J-STD-020F

| Item        | Ramp-up      | Pre-heating   | Reflow     | Peak Temp. | Cooling              |
|-------------|--------------|---------------|------------|------------|----------------------|
| Temp. scope | R.T. ~150 °C | 150 °C~200 °C | 217 °C     | 260±5 °C   | Peak Temp.<br>150 °C |
| Time spec   | -            | 60~120 sec    | 60~150 sec | 20~40 sec  | -                    |

Note:

1. IR reflow times: within 3 times
2. Nitrogen adopted is recommended while in IR reflow

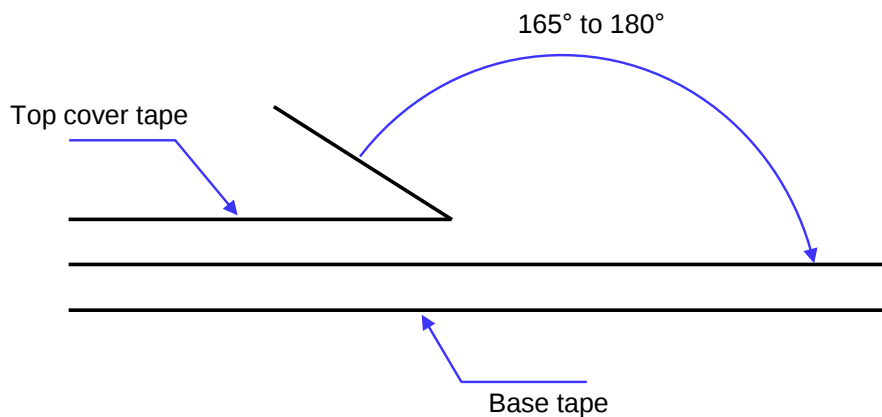
## AMNI00070770 Series Specification

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### 11 Packaging

#### 11.1 Packaging-cover tape

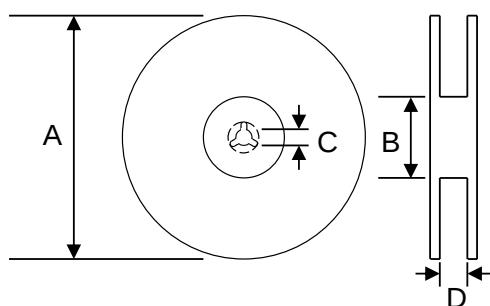
The force for tearing off cover tape is 10 to 130 grams.



#### 11.2 Packaging quantity

| Type   | pcs/reel |
|--------|----------|
| 070770 | 300      |

#### 11.3 Reel dimensions



Dimensions in mm

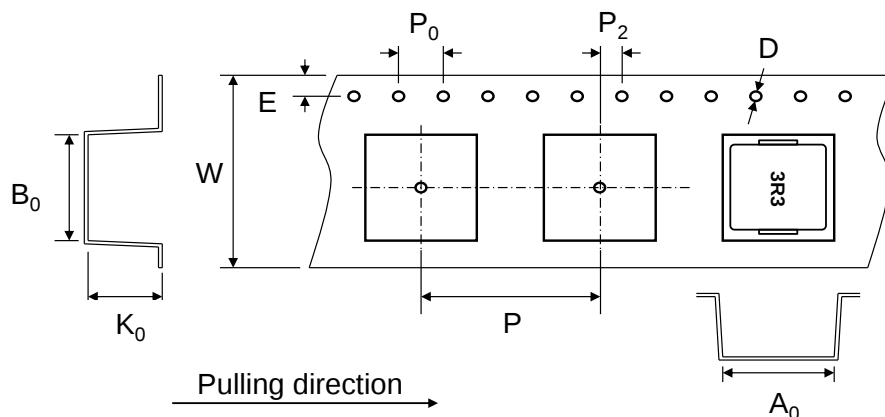
| Type   | A   | B   | C  | D    |
|--------|-----|-----|----|------|
| 070770 | 330 | 100 | 13 | 24.2 |

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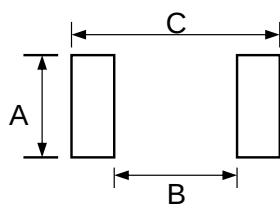
### 11 Packaging

#### 11.4 Tape dimensions in mm



| Type   | A <sub>0</sub> | B <sub>0</sub> | K <sub>0</sub> | D   | E    | W  | P  | P <sub>0</sub> | P <sub>2</sub> |
|--------|----------------|----------------|----------------|-----|------|----|----|----------------|----------------|
| 070770 | 8.2            | 7.9            | 7.3            | 1.5 | 1.75 | 24 | 16 | 4              | 2              |

### 12 Recommended pattern



Dimensions in mm

| Type   | A   | B   | C   |
|--------|-----|-----|-----|
| 070770 | 5.5 | 3.7 | 8.0 |

### 13 Note

1. Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.
2. Don't design/mount any components in contact with this product.
3. The moisture sensitivity level (MSL) of products is classified as level 1.
4. Shelf life: 1 years from the date of shipment.

# AMNI00070770 Series Specification

AEC-Q200

## 14 Graph

